

Preliminary Amendment

Applicant: Thomas Hecht et al.

Serial No.: Unknown

(Priority Application No. DE 102 45 537.6)

(International Application No. PCT/DE03/03188)

Filed: Herewith

(Priority Date: September 30, 2002)

(International Filing Date: September 24, 2003)

Docket No.: I433.153.101/13.555

Title: METHOD AND PROCESS REACTOR FOR SEQUENTIAL GAS PHASE DEPOSITION BY MEANS OF A PROCESS CHAMBER AND AN AUXILIARY CHAMBER (As Amended)

JC17 Rec'd PCT/PTO 29 MAR 2005

IN THE CLAIMS

Please cancel claims 1-15 without prejudice.

Please add claims 16-35 as follows:

Patent Claims WHAT IS CLAIMED IS:

1-15. (Cancelled)

16. A method for depositing a layer on a substrate arranged in a process chamber of a process reactor by means of a sequential gas phase deposition, the method comprising:
introducing at least one first process gas and one second process gas into the process chamber;

removing at least one first process gas and one second process gas from the process chamber alternately one after the other;

wherein, for the partial removal of at least one of the process gases, the process gas is rarefied by an at least partial pressure equalization of a pressure difference present between a process pressure prevailing in the process chamber and an auxiliary pressure in an auxiliary chamber of the process reactor that is significantly lower at the beginning of the pressure equalization.

17. The method of claim 16, further including providing the auxiliary pressure at the beginning of the pressure equalization with at most one tenth of the process pressure.

18. The method of claim 17, further including providing the auxiliary chamber with at least ten times a volume of the process chamber.

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19. The method of claim 16, further including maintaining the pressure difference between the process pressure and the auxiliary pressure during the introduction of one of the process gases by a pumping operation acting between the auxiliary chamber and the process chamber and bringing the pressure equalization about at least partly by ending the pumping operation.

20. The method of claim 16, further including producing the pressure difference between the process pressure and the auxiliary pressure while one of the process gases is being introduced by means of a separating device hermetically sealing the process chamber with respect to the auxiliary chamber in a closed state and pumping out of the auxiliary chamber, and bringing the pressure equalization about at least partly by opening of the separating device.

21. The method of claim 16, further including building up the pressure difference between the process pressure and the auxiliary pressure after the rarefaction of a first process gas by a pumping operation of a pumping device producing a pressure difference prevailing between the process pressure in the process chamber and the auxiliary pressure in the auxiliary chamber and closing of the separating device and evacuation of the auxiliary chamber.

22. The method of claim 21, wherein, after the switching on of the pumping device and the closing of the separating device, a further process gas is introduced into the process chamber and residual fractions of the first process gas that are in the process chamber are forced out of the process chamber.

23. The method of claim 16, further including providing a valve device to avoid flowing back of the process gas into the process chamber.

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24. The method of claim 16, further including introducing a further process gas into the process chamber to avoid flowing back of the process gas into the process chamber.
25. The method of claim 22, wherein a chemically inert purging gas is provided as the further process gas.
26. The method of claim 16, further including evacuating the auxiliary chamber during the pressure equalization.
27. The method of claim 16, further including introducing a second process gas, having a precursor intended for deposition, into the process chamber during the evacuation of the auxiliary chamber.
28. A process reactor comprising:
a process chamber configured for producing a layer on a substrate by means of a sequential gas phase deposition, wherein at least one first process gas and one second process gas are respectively introduced into the process chamber and removed from the process chamber alternately one after the other;
a susceptor configured inside the process chamber and on which the substrate rests;
feeds for introducing process gases; and
an auxiliary chamber for rarefaction of at least one of the process gases, wherein the auxiliary chamber can be evacuated to an auxiliary pressure significantly lower than a process pressure prevailing in the process chamber during the deposition and is to be alternately connected to the process chamber and separated from the process chamber.
29. The process reactor of claim 28, further comprising a separating device having a closed state that closes the process chamber with respect to the auxiliary chamber and having an opened state that connects the auxiliary chamber and the process chamber.

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30. The process reactor of claim 28, further comprising a pumping device producing a pressure difference acting between the process pressure in the process chamber and the auxiliary pressure in the auxiliary chamber.

31. The process reactor of claim 28, further comprising a valve device blocking flowing back of a process gas from the auxiliary chamber into the process chamber.

32. A process reactor comprising:

a process chamber configured to produce a layer on a substrate using sequential gas phase deposition, wherein a first process gas and a second process gas are introduced into the process chamber and also removed from the process chamber;

a susceptor configured inside the process chamber and on which the substrate rests;
feeds for introducing process gases;

an auxiliary chamber for rarefaction of at least one of the process gases; and
means between the process chamber and auxiliary chamber for evacuating the auxiliary chamber to an auxiliary pressure significantly lower than a process pressure prevailing in the process chamber.

33. The process reactor of claim 32, wherein the means for evacuating further includes means for alternately connecting and separating the process chamber and the auxiliary chamber.

34. The process reactor of claim 32, further comprising a pumping device producing a pressure difference acting between the process pressure in the process chamber and the auxiliary pressure in the auxiliary chamber.

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35. The process reactor of claim 32, further comprising a valve device blocking flowing back of the process gas from the auxiliary chamber into the process chamber.